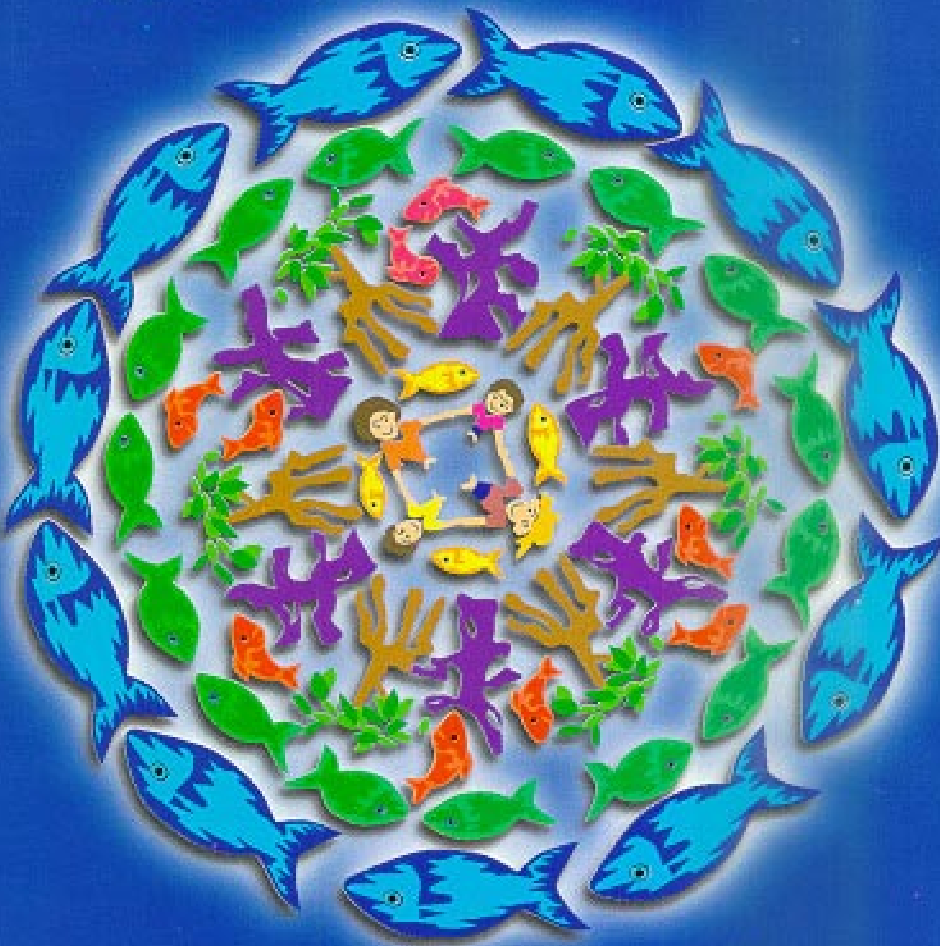
COASTAL RESOURCE MANAGEMENT FOR FOOD SECURITY



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FISH and FOOD SECURITY

Toni Parras

What is Food Security?

Food security has been defined in the Philippine Implementing Rules and Regulations of the Agriculture and Fisheries Modernization Act (DA DAO 6 [1998] Republic Act 8435) as follows:

> ***Policy objective, plan and strategy of meeting the food requirements of the present and future generations of Filipinos in substantial quantity, safety and nutritional quality that meets desirable dietary requirements, ensuring the availability and affordability of food to all, either through local production or importation, or both, based on the country's existing and potential resource endowment and related production advantages, and consistent with the overall national development objectives and policies. However, sufficiency in rice and white corn should be pursued.*** *Rule 4.1.11 DA DAO 6 s/ 1998*

Food security programs are often viewed as emergency measures, quick fixes to maintain one type of food source, grains. But, while emergency measures may be essential in some localities, more often, food security programs need short-, medium-, and long-term plans that integrate a variety of strategies to ensure a nutritionally-balanced food supply for all the people, all the time. In order to achieve food security, a stable, sustainable, and predictable supply of nutritionally-balanced food must be available through equitable access over a time horizon that extends essentially forever. After all, one cannot live on rice alone!

What is the Role of Fisheries in Achieving Food Security?

Fish and other aquatic resources should factor significantly in the food security equation. Fish provide approximately 25 percent of the animal protein in Asia *(McGinn 1998a)*. Indeed, in the Philippines, the importance of fisheries to food security cannot be overstated. Fish provide approximately 50 percent of the animal protein in the Philippines. In rural coastal communities, up to 80 percent of the animal protein may be supplied by fish caught in municipal waters *(Savina and White 1986)*.

And yet national food security programs rarely consider fishery resources in the inventory of stable, sustainable, and predictable food supply. At best, this is surprising considering the importance of fish in supplying the highest quality and most efficiently produced dietary protein in the world. At the worst, this is alarming given that data from international research organizations and experts throughout the world confirm that the global supply of fish is dwindling and in some cases collapsing under the heavy pressure of increased global population.

Rupert Sievert

The global catch of ocean life appears to have reached a plateau of about 90 million tons per year in the 1990s. Over 60 percent of the world's 200 main fish stocks are fully exploited, overexploited, or depleted *(Williams 1994)*. McGinn *(1998a)* estimates that 11 of the world's 15 major fishing grounds have reached, or even exceeded, maximum sustainable yields. The world's fishing fleets have suffered catastrophic financial losses as many of the ocean fish stocks have dropped to an all-time low. Meanwhile, however, aquaculture has exploded as one of the fastest growing sectors in world food production. From 12.4 million tons in 1990, farmed fish production nearly doubled to 23 million tons by 1996. For every 5 kilograms of beef produced worldwide, there are now 2 kilograms of farm-raised fish *(McGinn 1998b)*.

But while aquaculture production has delivered part of the promised production potential, it has also encountered serious production constraints and has resulted in environmental degradation effecting natural food production systems harbored in mangrove and coral reef ecosystems. Furthermore, population growth may now be outstripping food fish production. If current trends in population growth and coastal resource exploitation, in particular, overfishing and habitat degradation, continue, the availability and affordability of fish to provide a critical protein source will be lost.

The extensive shallow seas of the Philippines have historically been rich in coastal resources, fish and shellfish and the habitats, coral reefs, seagrass beds, and mangroves, that nurture them. Unfortunately, these resources are fast being depleted. Mangrove resources have diminished from 450,000 hectares at the beginning of the century to about 150,000 hectares today as a result of extensive fishpond development *(White and De Leon 1996)*. Other coastal resources also are severely degraded throughout the country. Of the estimated 27,000 square kilometers of coral reef habitat in the Philippines, less than 5 percent is considered in excellent condition and over 70 percent in poor to fair condition *(Gomez et al. 1994)*. Such numbers are nothing short of ominous, especially when viewed in the context of the country's ability to produce food for its people. A healthy coral reef can produce 20 metric tons of fish per square kilometer per year, enough fish to provide 50 kilograms of fish per year to 400 people. One square kilometer of reef in poor condition, on the other hand, produces no more than 5 metric tons of fish per year, barely enough to feed 100 people.

As population pressure increases, overfishing and habitat destruction are resulting in dwindling fish stocks. Over the last 10 years, even as fishers use more efficient and illegal gear, capture fisheries have stagnated, with significant declines in municipal fisheries throughout the Philippines. And, even with new technology and the expansion of fishpond areas, the once robust growth in fish production from aquaculture has turned sluggish, as existing fishponds suffer the consequences of inadequate production and environmental management. If current trends of overexploitation of coastal resources continue, fish will not be a staple food of the Philippines much longer.

Too Many Mouths to Feed

It is an indication of the severity of the fish production problem worldwide that, for the first time, UNICEF has measured in its global report protein-calorie deficiency in fishing communities. According to projections of the per capita food fish supply based on trends in fish production decline and population increase, if no action is taken in the Philippines, the annual portion of fish that could be available to each person would decline to about 10 kilograms by 2010, down from current estimates of 24 kilograms *(Bernascek 1994)*. This picture is bleak especially for a country like the Philippines, where as much as 80 percent of the dietary protein requirement in rural areas come from fish.

OUR FINITE SEAS

If current trends of overfishing and environmental degradation continue, coastal resources will not be able to provide enough food for the Philippines' growing population. It is imperative that food security programs include coastal resource management as a strategy for food security in the Philippines.

It is therefore imperative that food security programs include coastal resource management (CRM), working multi-sectorally with national government agencies and local government units, as a strategy for food security in the Philippines. To reverse the decline of municipal fisheries production, immediate action must be taken to change the open access fishing regime in the country. Medium- and long-term measures also must be taken to rehabilitate coastal ecosystems to achieve a stable, predictable, and sustainable source of the most nutritious and economical protein available today — fish and other edible marine plants and animals.

Toni Parras

A CLOSER LOOK
at Philippine Fisheries in Decline

The answer to the continuing decrease in the amount of fish available as food is not to increase pressure on the resource by allowing more fishing but to reduce pressure and allow the stocks to recover.

The supply of fish throughout the world is becoming increasingly scarce *(Williams 1994; McGinn 1998a)*. As the supply continues to decrease, it will become more and more difficult to meet the food requirements of the world's population. More than 60 percent of the world's 200 major fish stocks are fully exploited, overexploited, or depleted. The answer to this decrease in the amount of fish available as food is not to increase pressure on the resource by allowing more fishing but to reduce pressure and allow the stocks to recover.

Trends in Fisheries Production of Food

Although the total production of aquatic resources has increased slightly in the Philippines, the total amount of fish available as food from capture fisheries and aquaculture (Figure 1) has remained relatively stable since 1987 *(BFAR 1997)*. Since the population has

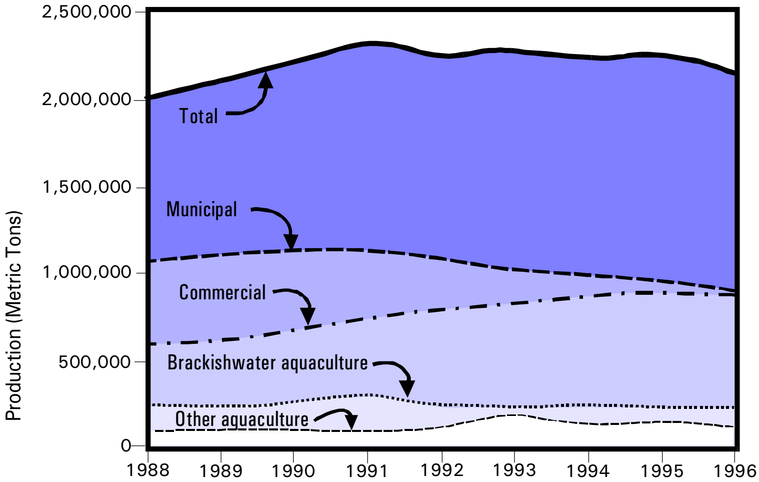


Figure 1. Fisheries-Related Food Production for 1988-1996 (BFAR 1997)
Note: Does not include seaweed production which primarily is used for industrial purposes.

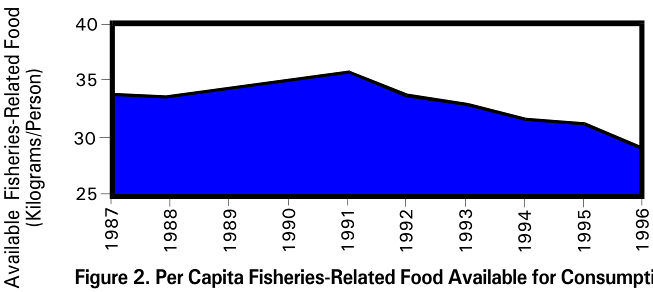


Figure 2. Per Capita Fisheries-Related Food Available for Consumption for 1987-1996 (Based on production data from BFAR 1997 and population data from Bernascek 1994.)

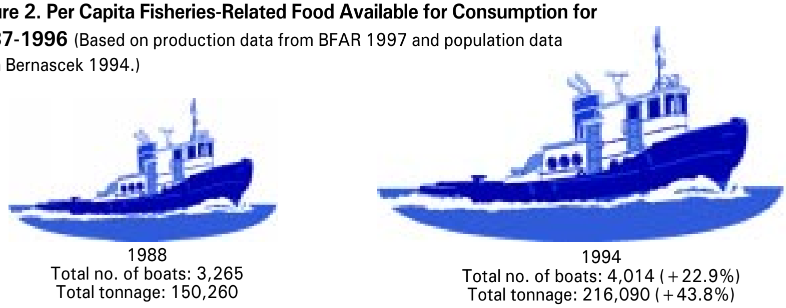


Figure 3. Number of Commercial Boats and Tonnage for 1988 and 1994 (BFAR 1997)

DIMINISHING RETURNS

When measured against population growth, the country's fisheries-related food production has recorded a net loss between 1987 and 1996, resulting in less fish available to each Filipino (Fig. 2). This, despite a dramatic increase in the number of fishing boats and their tonnage (Fig. 3)

grown at approximately 2.5 percent (or more) per year, this translates to a net loss of locally-derived fish protein to Filipinos.

Figure 1 shows how steadily production from municipal fisheries has decreased since 1991. Commercial fisheries have increased over much of that period, although its rate of increase has slowed dramatically in recent years. The contribution from aquaculture (primarily milkfish and prawn) has remained relatively unchanged. The total fisheries-related food production shown in Figure 1 does not include production of seaweed, which has increased from 40 percent of the total aquaculture production in 1992 to 64 percent by 1996 *(BFAR 1993, 1997)*. While this production is important in earning foreign exchange and thereby helps to assure food security, it is not eaten directly except in small amounts.

Although fisheries-related food production has been relatively static for the 10-year period in question, a slow and continuous decline is apparent when total production is evaluated as kilograms of “fish” available per person per year, as shown in Figure 2 (fish is defined here as all edible marine products and includes both animals and plants). This decline is driven by population growth, increased fishing pressure, destructive fishing practices, and unsustainable fisheries and aquaculture development.

Fishing pressure from commercial fisheries has increased as the number of fishing boats and their tonnage grew significantly between1988 and 1994 (Figure 3). The number of boats increased an average of almost 4 percent per year during the period, while the tonnage rose on average more than 7 percent annually. At this rate, the pressure on the resource will go far beyond what the increase in the number of boats alone suggests, since the higher increase in tonnage suggests that larger, more efficient boats are coming into the fleet.

Using historical municipal fisheries production data and assuming that the number of municipal fishers has followed the trend in population increasing at a rate of approximately 2.5 percent per year, there is a clear decrease in the catch per fisher from the municipal fishery (Figure 4). A similar trend is observed based on data collected through participatory coastal resource assessment, where coastal communities are actively involved in data collection, surveys, and evaluation of the status of the coastal resources in their areas (Figure 5). In small island communities, such as Olango Island, Cebu, the catch per fisherman is even lower. Olango fishers have estimated that their current daily fish catch per fisher is 2 kg per person. A similar trend is reported by Katon et al. (1998). They report that fishers in Cogtong, Candijay, Bohol found their catch decreasing from 20 kg/day in the 1960s to around 3 kg/day in the 1990s.

There are a number of reasons for the decline. The major reasons include an increase in the number of fishers depending on the resource and the increase in destructive fishing activities such as cyanide, dynamite, and small mesh trawls and other nets. Other factors contributing to the decline in municipal fisheries include increased siltation from deforestation, pollution from industrial activities sited along the coast, and increased development in coastal areas.

Aquaculture production of food fish at a first glance in Figure 6 suggests that production per hectare of fishpond the yield has increased as the total hectarage increased. Indeed, as the total hectarage approached 220,000 hectares, the general trend was of increasing productivity.

However, a significant decrease in yield occurred as the total fishpond area continued to expand beyond 220,000 hectares. The decrease coincided with a scale-back in extension services for fishpond operators *(Juliano 1996)*. Other factors, such as water quality problems in Laguna de Bay and dwindling fry stocks, also had an impact. Although there has been a continued increase in hectarage since the early 1990s, there is a relatively steep decline in production of fish and shrimp on a per hectare basis from aquaculture.

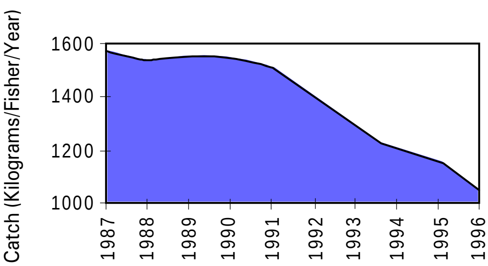


Figure 4. Estimated Average Annual Catch Per Municipal Fisherman for 1987-1996 [The municipal production data are from BFAR (1997). The data on the increase in the population of municipal fishers are adapted using data from BFAR (1993) and Bernascek (1994)]

IN DIRE STRAITS

Small fishers are catching fewer and fewer fish each year and sinking deeper into poverty. In its global report, UNICEF shows evidence of increasing protein calorie deficiency among the world's coastal residents.

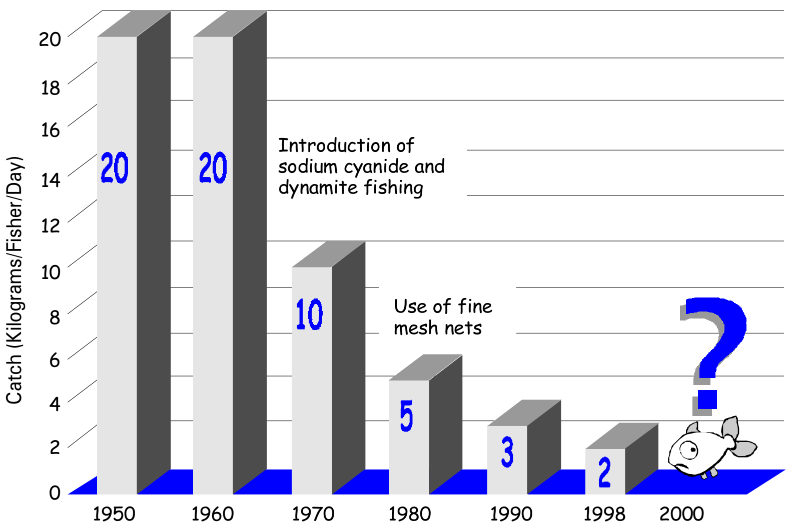


Figure 5. Trend of Estimated Daily Fish Catch per Municipal Fisher for One Barangay, Olango Island, Cebu (Result of community assessment of coastal resources conducted by the Coastal Resource Management Project 1998)

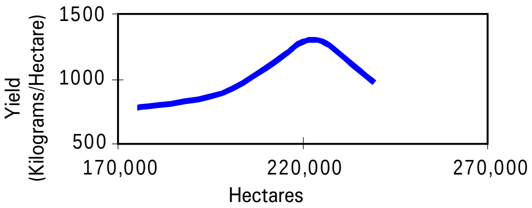


Figure 6. Brackishwater Fishpond Hectares Yield *(Primex 1996)*

UNFULFILLED PROMISE

Fishpond yield hit its ceiling when total area reached 220,000 hectares and has been on a steep decline since. Poor management and unsustainable aquaculture practices are major reasons for the decline.

The most recent data indicate that 940 kg/ha were produced in the Philippines in 1996 *(BFAR 1997)*, much lower than the Asian average. If natural fish production from the mangrove forest area using an average of 680 kg/ha *(CRMP 1997)* is compared to fishpond production *(using the data from PRIMEX 1996)* over the same period (1981 - 1996), we find that there is only a slight difference between the two in actual kilograms produced. In economic terms, the natural production is many times more valuable because it is essentially free. Unlike natural production systems, fishponds need many inputs including fertilizer, fry, and, of course, construction.

This small difference becomes even smaller when we factor in the equation the loans made by the Development Bank of the Philippines (DBP) for fishpond development. Approximately 200,000 hectares of fishpond were developed between the 1970s and the late 1980s at an average loan rate of 25,000 pesos per hectare. This yields a 5-billion peso investment for a tiny increase in the overall amount of available food!

Current data paint a bleak picture of the amount of food available from fisheries activities. The availability of food has remained virtually unchanged, if not slightly decreased over the last 10 years. When population growth is factored in, the available amount of fisheries-derived food per capita in the Philippines has decreased by 19 percent since 1990 (from 35.7 kg/person to 28.9 kg/person). Bernascek *(1994)* suggests that it may fall to less than 20 kilograms per person within the next twenty years. Some of the major issues associated with this decline are discussed below.

Causes and Factors Contributing to the Decline in Fisheries-Derived Food

This section discusses some of the issues that have contributed to the decline in fisheries-derived food availability. These problems can be categorized as:

- Continued increases in commercial and municipal fishing effort resulting from population growth and migration to coastal areas
- Slow economic development in coastal areas providing few alternatives to municipal fishers
- Use of habitat- and fishery-destructive fishing practices
- Illegal commercial fishing in municipal waters
- Open access to fishery resources
- Degradation of coastal habitats
- Conversion of mangroves to fish and shrimp ponds
- An overall lack of implementation of CRM programs at the local and national levels

Together these issues have damaged and continue to damage coastal resources available and decrease the potential fish catch. The factors contributing to the decline in Philippine fisheries are analyzed below by sector: commercial fisheries, municipal fisheries, and aquaculture.

Issues Associated with Commercial Fisheries

The major CRM issues faced by the commercial fisheries sector include:

- Reduced or collapsing commercial fish stocks
- Continued increases in fishing pressure resulting from increased numbers and tonnage of boats
- Theft of fish from municipal waters by local and foreign commercial vessels
- Theft of fish from the Exclusive Economic Zone (EEZ) by foreign commercial vessels

The continued increase in fishing pressure in commercial fisheries can be seen in the increase in the number of commercial boats and the increasing utilization of more efficient gear. This has led to decreases in

the major food fish stocks (roundscad, frigate tuna, and anchovies) utilized in the Philippines *(Bernascek 1994)*, with only sardine catches reported as increasing. Roundscad catches landed at Navotas have been undersized, a strong indication that the stock is overfished. Anchovies also appear to be in strong decline and likely to be "in danger of collapsing" *(Bernascek 1994)*. Increasing the pressure on these stocks will only hasten their demise.

THEFT
Commercial fishing vessels are fishing illegally in municipal waters and depleting municipal fish stocks.

Commercial fisheries in the Philippines have more than exceeded their maximum sustainable yield as evidenced by the leveling off of growth in catch and the local decreases in some of the stocks *(Dalzell et al. 1987; Bernascek 1994; BFAR 1997)*. Local commercial fishermen are attempting to maintain or increase their catch by intruding on municipal fishing grounds. Unfortunately, DA Department Administrative Order 3 Series of 1998, the Implementing Rules and Regulations for the new Fisheries Code (Republic Act 8550), allows BFAR to make provisions to increase the number of vessels by making available new loan funds for fishing boats. Continued increases in fishing effort will only worsen the problem and lead to the continued decline of the fish stocks on which the Philippines relies.

Foreign fishing boats steal fish from within the EEZ of the Philippines and deprive the country of fish for both food and foreign exchange. Equally distressing, Filipino commercial fishing boats are well known for their violations of municipal waters. In the first situation, foreign vessels remove fish from the Philippines for sale outside the country. In the second, Filipino commercial vessels remove fish from municipal waters and sell them elsewhere. In both cases, access to resources by their rightful recipients is blocked, resources are lost from the system, and equity is eroded.

Issues Associated with Municipal Fisheries
The major CRM issues faced by the municipal fisheries sector include:

- Reduced municipal fish stocks
- Continued increases in fishing pressure resulting from increased numbers of fishers

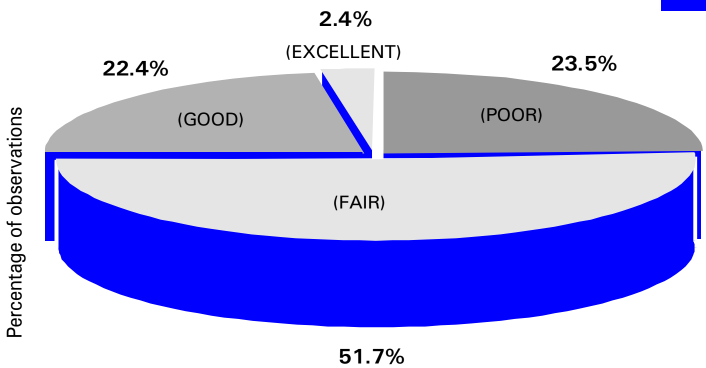
- Use of illegal and destructive fishing techniques
- Continued open access to the resources within municipal waters

Municipal fisheries have been in decline since about 1991 *(BFAR 1997)*. Assuming that the population of municipal fishers has mirrored the country's growth rate, the average catch per year for a municipal fisher has steadily decreased to less than 30 percent of what it was in 1991. Once again the data clearly show that increasing effort will not yield positive results (Figures 3 and 4). Work on Olango Island supports this finding. Municipal fishers there report that their catch has declined from 10 kg/day in the 1960s to less than 2 kg/day today. Since the bulk of this food resource stays in the barangay, this represents a serious health threat in the form of decreased protein for coastal residents. Recent studies by UNICEF indicate that some coastal residents are beginning to experience protein calorie deficiency for the first time in more than 20 years.

LOST REEFS
Reefs that are damaged or destroyed can take 50 years to recover. When the reefs are destroyed, the fish catch declines. One square kilometer of "good" reef can produce about 20 tons of fish per year.

Because the open access regime allows anyone access to the fishery, municipal fishers are forced to use more "efficient" fishing practices which are destructive and damage or destroy the coral reef habitat upon which fish depend. Such practices include the use of cyanide, dynamite, scare techniques using sticks and rocks, and fine mesh nets.

Fishing techniques that damage the habitats physically, or the use of fine mesh nets which remove small fish and



Coral reef condition as percentage of hard coral cover

0-24.9% Poor 25-49.9% Fair 50-74.9% Good 75-100% Excellent
(85 reefs sampled)

Figure 7. Condition of Coral Reefs in the Philippines *(Gomez et al. 1994)*

inhibit successful reproduction have short-term benefits but huge long-term costs. Reefs that are damaged or destroyed can take 50 years or more to recover *(Alcala and Gomez 1979)*. When the reefs are destroyed, the fish catch declines accordingly. One square kilometer of "good" reef can produce about 20 tons of fish per year for harvest; in contrast, a square kilometer of reef in poor condition produces less than 5 tons of fish per year *(White and Savina 1987)*. Destructive practices combined with siltation from deforestation have left less than 5 percent of coral reefs in the Philippines in excellent condition (Figure 7) *(Gomez et al. 1994)*.

The Philippines is an open access regime where anyone can fish anywhere for anything using virtually any kind of technique with little or no possibility of being caught and punished for any illegal acts. Because of this, there is lack of "ownership" on the part of the users of the resource and competition takes place among all users to try and maximize the amount of resource (fish) that they can remove over time. This lack of ownership is often referred to as the "tragedy of the commons". Catches decline, and fishers deem the use of destructive methods necessary to find and catch ever-smaller numbers of fish. Where overfishing occurs, fish cannot grow to maturity and therefore cannot reproduce. Farmers who raise cattle or goats understand the need to keep a few of the young for breeding purposes. Unfortunately, most municipal fishermen do not have this perspective.

Like the commercial fishery, the Philippine municipal fishery is facing a crisis where the resource users, the fishers, are increasingly unable to catch sufficient fish to feed themselves or the nation. The continued open access regime, coupled with the use of destructive fishing methods, is acting to decrease the amount of fish caught, not increase it. No technology is available to increase the quantity of fish captured with the current level of pressure on the resources.

Issues Associated with Aquaculture

The major CRM issues faced by the aquaculture sector include:

- Stagnant aquaculture production (except seaweed) for the last 10 years
- Lack of high-quality extension program to assist brackishwater aquaculture producers maximize yields
- Fishpond development dependent on reducing important mangrove forest resources
- Increasing number of illegal fishpond developments and failures

All forms of aquaculture — whether pond or cage, fresh water or marine — essentially have been flat in terms of production for the past ten years. Over the last ten years, brackishwater fishponds have on average outperformed all other forms of aquaculture, except seaweed, by a factor of two. Indeed, the only increase in production in the area of aquaculture is that of seaweed. This has led to the incorrect assumption that sufficient food is being produced. The issues associated with aquaculture (mostly brackishwater ponds) revolve around the loss of high quality extension services and the focus on building new ponds in the mistaken belief that they are helping to increase the amount of food available.

BFAR implemented a brackishwater extension program from the late 1960s which provided information on new or improved technologies to brackishwater fishpond operators. This program ended in 1987 when BFAR lost its line agency status *(Juliano 1996)*. During the time of the extension program's operation, the extension agents were able to provide assistance to thousands of fishpond operators on such issues as proper pond design, fertilizer regimes, stocking regimes, post-harvest fish handling and other areas. It was also during this period that the brackishwater fishponds saw their largest gains in productivity. With the loss of the BFAR extension program, the slide in productivity continues.

MANGROVES IN TROUBLE

The Philippines' "Blue Revolution" converted more than 200,000 hectares of mangroves to fishponds without analyzing potential losses that might occur as a result of the destruction of mangrove forests. It is now well accepted that mangrove forests can support more than 600 kilograms per hectare per year of natural fish production. Still a new upsurge in the development of illegal fishponds threatens the remaining mangrove areas.

In about 1974, as part of the "Blue Revolution", the Philippines started a program to encourage the "development" of mangrove forests into fishponds. There was no analysis of the potential losses that might occur as a result of the destruction of the mangrove forests nor was there an analysis of the appropriate economic rent for such areas. The program continued into the late 1980s and converted more than 200,000 hectares of mangroves to fishponds.

It is now well accepted that mangrove forests can support more than 600 kilograms per hectare per year of natural fish production in the nearshore waters. Even so, a new upsurge in the development of illegal fishponds threatens the remaining mangrove areas. In addition, increased population pressure in coastal areas is resulting in the

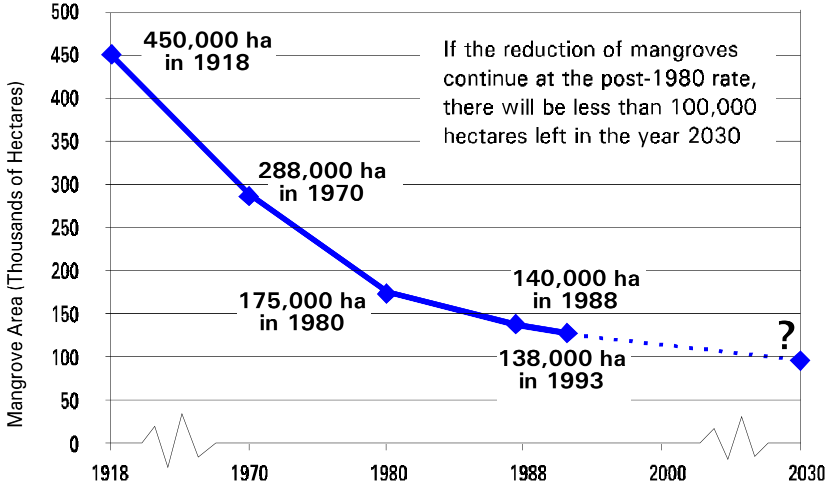


Figure 8. Mangrove Resource Decline in the Philippines *(DENR 1988; World Bank 1989; ADB 1993)*

destruction of mangrove forests from illegal construction of houses and other structures, such as port and harbor development and land reclamation. Without the implementation of Community-Based Forest Management Agreements (CBFMA) to manage these areas, it is quite possible that, within 70 years, all of the remaining mangrove habitats will be lost, having been converted to fishponds and other uses (Figure 8).

Brackishwater aquaculture in the Philippines is performing at less than 50 percent of its capacity. Focusing on the top five producing regions and allowing the remaining areas to revert to mangrove forest would eventually increase production to approximately 330,000 metric tons or more per year. Furthermore, reverting less productive or unproductive fishponds to mangrove status will allow the natural productivity associated with mangroves to be accessed by local municipal fishers.

COASTAL RESOURCE MANAGEMENT

for Food Security and Poverty Alleviation in Coastal Areas

Coastal resources, such as finfish and shellfish, and the habitats that nurture them — coral reefs, seagrass beds, and mangrove forests — are among the most fundamental elements of the Philippine environment. Overfishing, habitat destruction, and land-based pollution have resulted in the alarming degradation of the coastal environment and the deepening of poverty in coastal areas throughout the Philippines. Food security and poverty alleviation in coastal areas will only be achieved when fisheries and coastal habitats are managed for sustainable use. CRM achieves that goal.

In order to accomplish coastal resource management, multi-sectoral collaboration is crucial. The national government — in particular, BFAR and DENR (with support from all Philippine law enforcement organizations) — have national mandates for coastal resource management. The local government, however, is mandated to manage municipal waters and must stand as the front-line stewards of food security through sustainable coastal resource use and regulation. Local government units must facilitate the formation of barangay and municipal-wide resource management organizations to address and resolve issues associated with commercial fisheries, municipal fisheries, aquaculture, and the preservation of marine biodiversity. They must support participation of coastal residents since law enforcement will only be effective with broad-based

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community awareness and support. Three critical results are needed for sustainable coastal resource use.

Three Critical Results Needed for Sustainable Coastal Resource Use

A sustainable food supply from municipal waters will only be realized when three critical results are achieved:

Critical Result 1: **Fishing effort reduced to sustainable levels**
Critical Result 2: **Illegal and destructive fishing practices stopped**
Critical Result 3: **Coastal habitats protected and managed**

To achieve these results, specific interventions must be implemented by local government units, national government agencies, and other organizations. The interventions provided below by critical result, represent sound and precautionary CRM practices.

NO TIME TO LOSE

A sustainable food supply from municipal waters will only be realized when fishing effort is reduced to sustainable levels, destructive fishing is stopped, and coastal habitats are protected and managed.

Critical Result 1: **Fishing effort reduced to sustainable levels.** Overfishing inside and to a lesser extent outside municipal waters is the primary cause of the serious decline in fisheries in the Philippines. Strategic interventions to reduce fishing effort include:

- **Improve license, permit, fee, and regulation system for commercial fishers.**
  - Implement phased reduction in the number of licenses issued over a 5-year period for commercial fishers.
  - Effectively exclude all commercial vessels from municipal waters.
  - Monitor and enforce licensing.
  - Increase licensing fees to reflect true economic rent for commercial boats.
  - Monitor changes in fish catch per unit effort to determine sustainable harvest levels.

- **Identify sustainable economic incentives that target reducing the number of municipal fishers.**
  - Conduct special skills training programs for municipal fishers with job placement in local industries.
  - Introduce small-scale low-impact mariculture development in municipal waters that is regulated by local government units

through a zoning, permit, and fee system designating specific areas for these activities away from critical habitats and limiting the scale of development to avoid polluting nearshore spawning grounds and endangering natural fish stocks.
    - Implement sustainable aquaculture practices in existing, operating fishponds to improve production, reduce impacts on the coastal environmental, and increase employment opportunities for municipal fishers.
    - Register and license municipal fishers through local government units.

- **Limit all fish-aggregating devices and artificial reefs in municipal waters.**
    - Limit through local ordinance the deployment of artificial reefs, *payaos*, and other fish-aggregating devices that have exacerbated the overfishing problem.
    - Establish marine sanctuaries through municipal ordinance around existing artificial reefs to allow recruitment and to increase fishery production potential.

- **Reduce population pressure in coastal areas.**
    - Conduct public awareness campaigns linking family planning and improved health and welfare.
    - Strengthen family planning programs within each province to reduce population growth.
    - Improve agricultural practices and land tenure agreements for upland and lowland farmers to lessen migration to coastal areas.

Critical Result 2: **Illegal and destructive fishing practices stopped.**
Illegal fishing in municipal waters has resulted in relatively small economic gains to a few individuals and large economic losses to the majority of coastal stakeholders. Strategic interventions to stop illegal fishing in municipal waters include:

- **Enforce fishery laws.**
    - Establish Bantay Dagat enforcement programs nationwide that provide for swift, painful, and public action to stop destructive fishing practices and illegal commercial fishing in municipal waters. This strategy will provide direct benefit and equity to the larger number of municipal fishers and coastal stakeholders employing legal and sustainable methods and serve as the greatest deterrent to those violating national and local laws.

- Conduct intensive information, education, and communication campaigns in coastal communities about basic ecology, coastal resource use issues, and existing laws to protect the coastal environment.
- Organize law enforcement groups at the barangay level with local government support.


Toni Parras

- **Pass municipal ordinances that prohibit destructive fishing practices.**
  - Ban the use of fine-mesh nets, gill nets, and drift nets in municipal waters which capture target and non-target fish of all sizes, including marine mammals and other endangered species.
  - Ban the use of hookah rigs which enable fishers to use noxious chemicals and overharvest coastal resources.

Critical Result 3: **Coastal habitats protected and managed.** The quality of critical coastal habitats, in particular, coral reef, seagrass, and mangrove habitats, must be maintained and improved for sustainable coastal resource use.

- **Strictly enforce laws protecting coastal habitats.**
  - Strictly enforce laws that ban the collection of living corals and other marine invertebrates, including giant clams and *Triton* shells.
  - Strictly enforce laws on foreshore use that require minimum shoreline setbacks for any development activity.
  - Stop illegal development of fishponds in mangrove areas.
  - Monitor all coastal development activities that may have direct or indirect impacts on coastal habitats through extraction or water pollution. These include all activities that occur in coastal areas, such as harbor development, land reclamation, housing, sand and gravel extraction, and industrial discharges.

- **Establish marine sanctuaries to rehabilitate habitats and increase fisheries production.**
  - Identify areas suitable for marine sanctuaries.

- Enlist community participation, support, and awareness for the value of marine sanctuaries.
- Designate marine sanctuaries through municipal ordinance.
- Advertise marine sanctuary designation and location through community awareness campaigns.
- Organize resource management councils (e.g. FARMCs) to sustain management of marine sanctuaries.

E. Cu Unjieng

- Conduct community-based monitoring studies to measure changes in fish abundance and quality of coral reef habitats and communicate these positive changes to the community at large.

- **Develop CBFMAs for sustainable mangrove resource use.**
  - Conduct an inventory of mangrove areas suitable for CBFMA.
  - Identify interested communities and people's organizations within suitable areas.
  - Facilitate preparation and submission of CBFMAs for DENR approval.
  - Monitor compliance of the community with the forest management agreement.

- **Revert abandoned fishponds to mangrove areas to increase fisheries production**.
  - Inventory abandoned fishponds.
  - Cancel lease agreements for abandoned fishponds, revert and reclassify as forest land.
  - Develop CBFMAs, where appropriate.

- **Establish functional Protected Area Management Boards for Marine Protected Areas, Parks, and Seascapes under the National Integrated Protected Areas System.**
  - Provide resources and funding to facilitate planning activities for all Protected Area Management Boards.
  - Complete approved Protected Marine Area Management Plans.
  - Implement Protected Area Management Plans.

BRING BACK OUR FUTURE!

Implementing immediate and short-term actions toward coastal resource management will play an important role in stabilizing and rehabilitating fishery resources to provide food and livelihood for current and future generations.

Stewardship, Partnerships, and Multi-Sectoral Collaboration for Action and Results

The Philippines is facing the beginning of a crisis in the security of food from aquatic resources. Coastal resource management addresses two key elements of the food security and poverty alleviation equation: ensuring a sustainable food supply from the sea, and increasing the earning power of the coastal poor to purchase food. The goal of CRM is to manage all of our coastal resources in a sustainable manner while allowing the greatest benefit to accrue to the largest number of people for the longest possible time. CRM accomplishes this goal through a participatory process of planning, implementing, and monitoring sustainable uses of coastal resources through collective action and sound decision-making.

As the primary mandate for managing municipal waters lies with the local government, municipalities, cities, and provinces must serve as action centers for results. Implementing immediate and short-term actions toward CRM will play an important role in stabilizing and rehabilitating fishery resources and critical coastal habitats to provide food and livelihood for current and future generations. Local government units cannot, however, accomplish the job alone and must receive technical assistance and support from national government agencies and other organizations to implement sound management of coastal resources. Local government units must serve as action centers for achieving the three critical results in CRM and must seek opportunities for partnerships and multi-sectoral collaboration to accomplish the job.


Arquiza/Buenaflor

- Local government units must serve as stewards of coastal resources to sustain food production and economic benefits. Stewardship involves taking care of the coastal environment and resources upon which all people ultimately depend. It entails a strong political will, as some actions to achieve the three critical CRM results may, in the short term, be unpopular and perceived as anti-poor.

- Partnerships with private sector, financial institutions, and foreign donors can facilitate sustainable economic development activities in coastal areas to reduce fishing pressure and bring focus to additional resources and funding that may be needed to achieve the three critical coastal resource management results.
- Multi-sectoral implementation groups formed at the provincial level can provide a mechanism to consolidate resources and technical capacity available from local government units, national government agencies, academic institutions, and non-government organizations to help municipalities achieve the three critical coastal resource management results.

Through stewardship, partnerships, and multi-sectoral collaboration, the three critical CRM results — fishing effort reduced, illegal fishing stopped, and critical coastal habitats protected — will achieve a positive and measurable impact on food security today and into the future. Being closest to the day-to-day problems, local government units will have the unique insight and incentive to implement sound practices in CRM. But they also represent the coastal environment's last safety net. Without leadership and action on the part of local government and communities, the coastal resource base that supports economic development in coastal areas will ultimately collapse under the pressure of overpopulation and overexploitation.

MANAGE OUR COASTAL RESOURCES

Coastal resource management is a participatory process of planning, implementing, and monitoring sustainable uses of coastal resources through collective action and sound decision-making.

ACTION ITEMS FOR LOCAL GOVERNMENT UNITS TO ACHIEVE THREE CRITICAL RESULTS IN COASTAL RESOURCE MANAGEMENT

	What Can Local Government Units Do?	Opportunities for Partnerships and Multi-sectoral Collaboration
Immediate: 6 MONTHS	• Establish a provincial-level multi-sectoral working group and information, education, and communication network. • Conduct CRM legal and jurisdictional orientation sessions to promote widespread knowledge of the laws governing coastal resource use and responsibilities of national and local government agencies. • Develop a detailed multi-sectoral action plan to achieve the three critical results with tasks, schedules, and responsibilities defined for local government units, national government agencies, and other organizations. • Develop and disseminate informational materials and conduct public awareness meetings to explain the importance of achieving the three critical results for sustainable coastal resource use and the planned interventions to achieve the results. • Increase number of deputized enforcement officers specifically trained in coastal law enforcement and provide operating funds.	• CRM technical, financial, and information dissemination resources are available from LGUs, national government agencies, NGOs, academic institutions, private sector, and donor-assisted projects. • Coastal law enforcement capacity is available from Bantay Dagat, PNP, Philppine Navy, and Philippine Coast Guard. • IEC network can be supported by information officers from LGUs, PIA, DOH, DENR, and DA-BFAR in partnership with radio stations and print media. • Training for CRM and coastal law enforcement and deputization is available through DA-BFAR, DA-ATI, and academic institutions.
Short-term: 1 YEAR	• Allocate budget for CRM planning, implementation, enforcement, and monitoring. • Establish municipal Fishery and Aquatic Resource Management Councils. • Establish provincial resource management organizations. • Establish new marine sanctuary sites by municipal ordinance. • Assess status of all fishponds in each municipality.	• National government agencies such as DENR, DA, DILG, and NEDA can assist in identifying funds from donor agencies. • BFAR is mandated to assess the status of all fishponds and cancel lease agreements for abandoned fishponds. • DENR is responsible for technical guidance on and issuance of community-based forest management agreements.

Short-term: 1 YEAR	• Identify abandoned fishponds for reversion to mangrove forest. • Identify mangrove forest areas for community-based forest management agreements. • Develop Provincial Medium-term and Long-term CRM Plans through municipal and community consultation and planning. • Establish functional Protected Area Management Boards for each Marine Protected Area.	• BFAR, DENR, and academic institutions can assist in identifying and monitoring marine sanctuaries. • DENR chairs the Protected Area Management Board composed of LGUs, POs, NGOs, and other organizations.
Medium-term: 5 YEARS	• Institutionalize CRM implementation mechanism within LGU structure to spearhead and sustain CRM planning, implementation, and evaluation process. • Implement Provincial CRM plans with regular budget allocation. • Monitor and evaluate CRM plan implementation. • Regularly evaluate and make revisions to CRM Plan. • Complete approved Protected Area Management Plans for each Marine Protected Area.	• National government agencies and local government units prioritize and synergize budget allocations for CRM implementation.
Long-term: 10 YEARS	• Monitor and enforce CRM plan. • Regularly evaluate and make revisions to CRM Plan.	• Donor agencies program external funding in support of synergized national and local initiatives.

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The goal of coastal resource management is to manage all of our coastal resources in a sustainable manner while allowing the greatest benefit to accrue to the largest number of people for the longest possible time.

promoting leadership for sustainable coastal resource management

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